THE AMERICAN REVIEW OF TUBERCULOSIS

JOURNAL OF THE NATIONAL TUBERCULOSIS ASSOCIATION

ABSTRACTS OF TUBERCULOSIS

EDITOR

ALLEN K. KRAUSE, Baltimore, Maryland

ASSOCIATE EDITOR

MAX PINNER, Ithaca, N. Y.

EDITORIAL STAFF

E. R. BALDWIN, Saranac Lake, N. Y.
LAWRASON BROWN, Saranac Lake, N. Y.
ESMOND R. LONG, Phildelphia, Pa.
J. A. MYERS, Minneapolis, Minn.
H. J. CORPER, Denver, Col.

VOLUME XXXVI

JULY-DECEMBER, 1937

PUBLISHED MONTHLY

AT MT. ROYAL AND GUILFORD AVENUES, BALTIMORE, MD.

BY THE NATIONAL TUBERCULOSIS ASSOCIATION

THE

AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS OF TUBERCULOSIS

VOLUME XXXVI AUGUST, 1937 ABST. No. 1

CONTENTS

	PAGES
Treatment (*concluded*)	1- 3
Diseases Other than Tuberculosis	3-17
Prognosis and Prevention	17-21

Total Pneumonectomy.—A detailed description of the technique of pneumonectomy for both right and left lung is presented. The method used is based upon a series of 10 total and 20 partial pneumonectomies. Of the 10 total pneumonectomies, 4 were on the right side and six on the left. Eight were operated upon for tumors of the lung and 2 for unilateral tuberculosis. In the group there was one death each due to diffuse lobular pneumonia, metastasis of the tumor to the brain, tuberculosis of the remaining lung, and pulmonary embolism.—*The Surgical Technic of Total Pneumonectomy, W. F. Rienhoff, Jr., Arch. Surg., February, 1936, xxxii, 218.*—(*L. F. B.*)

Contralateral Spontaneous Pneumothorax Complicating Lobectomy.—The author reports 3 cases, two of which died, of contralateral spontaneous pneumothorax occurring during lobectomy. Although no definite opening could be found at autopsy, it was concluded that a small opening was made through the mediastinum at the time of operation. Death in the third case was prevented, when it was found that the lungs did not expand well on discontinuing positive-pressure anaesthesia, by inserting a catheter between the ribs on the contralateral side, allowing the air to escape under water and continuing the positive-pressure anaesthesia. It is conceivable that contralateral pneumothorax might result from a rupture of one or several alveoli on the unoperated side if the patient's breathing is labored or too high positive pressure is delivered through the anaesthetic apparatus. Any change in the respiratory action, associated with failing of the pulse should immediately suggest contralateral pneumothorax. Increased positive pressure and an outlet for air on the contralateral side is the suggested procedure of choice.—*A Consideration of Contralateral Pneumothorax as a Complication of Intrathoracic Operations, H. B. Stephens, J. Thorac. Surg., June, 1936, v, 471.*—(*L. F. B.*)

Scaleniotomy.—The author employed scaleniotomy and phrenicoexairesis in those cases in which pneumothorax was tried with negative results, and plastic operation in some form or plombage was not indicated, or as a complementary operation in incomplete pneumothorax when plastic operation or cauterization could not be resorted to. The direct effect lay not simply in an increased collapse, but rather in a considerably reduced respiratory movement in that half of the thorax. Not much change in the shape of the thorax could be seen in a radiograph, but the decreased movement could easily be seen by direct illumination. Usually a marked improvement could be observed after the operation; cough, temperature and general condition were usually favorably affected. As a rule, expectoration increased

immediately after the operation and then diminished, and tubercle bacilli often disappeared from the sputum. Roentgenologically the cavities disappeared and the tuberculous process became more fibrous.—*Scaleniotomy in Pulmonary Tuberculosis. Observations at Sandträsk Sanatorium, Å. Törnblom, Acta. Tuberc. Scandinav., Fasc. 4, December, 1935, ix, 329.*—(*F. B. S.*)

Abdominal Compression in Treatment of Pulmonary Tuberculosis.—In a series of 211 patients with fibroid pulmonary tuberculosis diaphragmatic elevation was accomplished by means of a special abdominal support, held in place by a backpiece, straps and buckles. Such supports have been worn for from two to thirty months, day and night, except in the presence of intestinal tuberculosis and malnutrition, when removed for short periods. Eighty-two patients were ambulatory practically throughout, 33 working, while the others had sanatorium care or its equivalent. *Results:* Symptomatic relief from dyspnoea and difficult expectoration was the rule, especially in those with the fibroid type of disease and a well-developed abdomen. Ninety patients gained in strength and general well-being. The unsatisfactory results occurred in cases with acute extension or soft, caseating lesions. There was usually a decrease in coarse râles, especially at the bases. X-ray films showed an average elevation of the diaphragm of 1.2 cm. Structural (pathological) improvement occurred in 43 (17 ambulatory), as evidenced by decrease or disappearance of cavities and retrogression of other lesions. In 4 patients whose supports were removed, an increase of cough and dyspnoea followed almost immediately. Two apical cavities which developed under pneumothorax closed after reëxpansion and abdominal compression. Capacity to exercise safely was noted in 26 with cavitation and fibrosis. Vital-capacity studies showed an initial reduction with later gradual return toward normal. There was a temporary increase in respiratory rate in most. *Physiological considerations:* These are discussed to some degree and some hypotheses put forward. Gordon favors this measure to counteract deep vertical pulmonary excursions, which he regards as detrimental, and to reduce pulmonary ventilation (?) which favors the progression of disease (?).—*The Mechanism and Effects of Abdominal Compression in the Treatment of Pulmonary Tuberculosis, B. Gordon, New England J. M., January 30, 1936, ccxiv, 195.*—(*A. P.*)

Oxygen Administration by Nasal Catheter.—It is now generally agreed that for prolonged oxygen administration its proportion in the inhaled air should be between 35 and 60 per cent, that is, about 30 to 55 per cent in the alveolar air. Higher proportions are irritant and induce dangerous inflammation. The widespread impression that nasal catheter administration cannot attain these concentrations is challenged by recent American studies, but to be effective a flow of 4 to 16 liters per minute is required, which is far beyond what is generally used. This paper describes apparatus presenting new features and records experimental data on alveolar oxygen concentrations with this apparatus. *Description of Apparatus:* Two catheters, each 3½ inches long, are used, about 3 inches of each lying within the nose, which may require preliminary cocainization. The catheters are made of ordinary cycle valve tubing, soft and thin-walled, and of minimum cross section. The catheter carrier is an adaptation of the laryngologist's head mirror strap, buckling at the side and with padded knots on either side of the bridge of the nose. A corrugated rubber forehead pad is substituted for the ordinary wool and wash-leather. The carrier is strapped on before introducing the catheters, which should be lubricated with liquid paraffin. There are also *flowmeters* and *humidifiers*, the former being of the type of water flowmeter with a small colored bead floating on the top of the column. The springs holding the bung allow it to lift if pressure is excessive. A newer model with a slightly taller bottle serves as a humidifier. Oxygen cylinders should be fitted with pressure regulators automatically reducing the pressure to 3 to 5 pounds. Effective nasal catheter administration demanding a considerable flow, large cylinders are most economical, lasting about six hours at 8 liters per minute, 1 cubic foot yielding 28.3 liters. To facilitate transportation, a stand of the porter's barrow type is used, can be wheeled easily about and loading or unloading is not difficult. The twenty-four hour cost in oxygen is roughly 10S to £2 (or $2.50 to $10.00 in United States money). *Experimental Work and Results:* The determinations of oxygen concentration in alveolar air were made upon two normal subjects, samples being collected by the syringe and whistling method. They were analyzed in a Haldane gas analysis apparatus. For each subject two sets of determinations were made, at 4, 8, 12 and 16 liters per minute, (1) breathing through the nose, and (2) through the mouth. Respiratory rate has previously been shown to make little difference. *Summary:* 1. Apparatus, new in several respects, for the nasal catheter administration of oxygen has been described. 2. Alveolar oxygen concentrations at flows

from 4 to 16 liters per minute, ranged from 29 to 58 per cent, (Mean-values). Thus, the fact that optional concentrations of oxygen for prolonged administration can be obtained by the apparatus has been demonstrated.—*Oxygen Administration by Nasal Catheter, H. L. Marriott & K. Robson, British M. J., January 25, 1936, No. 3916, 154.*—(*A. P.*)

Maggot and Allantoin Treatment.—Seven cases, in addition to the one previously reported, of maggot therapy in tuberculous and nontuberculous suppurative lesions of the lung and pleura, and one case treated with allantoin alone, are reported. Of 3 cases of tuberculous empyema with bronchopleural, pleurocutaneous fistula, one is cured following thoracoplasty, one is permanently improved and awaiting thoracoplasty, and one is dead of contralateral disease after showing temporary local improvement. One patient with tuberculous osteomyelitis and bronchocutaneous fistula showed temporary improvement and died of disseminated disease. One patient with recurrent nontuberculous empyema was cured. One patient with gangrene of the lung showed temporary improvement and died of pulmonary haemorrhage unconnected with the specific therapy. One patient with abscess of the lung was cured. One patient with tuberculous empyema, treated with 0.5 per cent solution of allantoin irrigations, was unimproved, and died. Maggots will ingest living tubercle bacilli, and there is some clinical evidence that they are not simply excreted unchanged.—*Maggot and Allantoin Therapy in Tuberculous and Nontuberculous Suppurative Lesions of the Lung and Pleura, N. Bethune, J. Thorac. Surg., February, 1936, v, 322.*—(*L. F. B.*)

After-Care of Tuberculosis in London.—The organization of after-care in London is unique chiefly in the enormous size of the population and the division of responsibility into borough units. In the main, the "voluntary" principle is followed of a Care Committee of voluntary workers in intimate association with a dispensary and the officers of the borough and county public-health services. In many instances, however, a previously voluntary secretary has been replaced by one employed and paid for by the borough. Only three voluntary care-committee secretaries remain, all highly efficient and experienced. Of the 28 London boroughs, 23 have voluntary Care Committees. Hackney and Stoke Newington have a joint committee; Greenwich and Bethnal Green, none; and Bermondsey and Lambeth, almoners who are officers of the borough councils. Generally speaking, the originating agent is the Tuberculosis Officer or Care Committee Secretary. Also, what happens to the patient after his discharge from a sanatorium is more important than his treatment while there. At the London County Council institutions, it is now customary for a visiting almoner to visit them periodically in order to link up treatment and after-care. This has long been the custom with the Brompton Hospital and the sanatorium at Frimley. Some emergency funds should be available to a Care Committee. *Special settlements and workshops:* Prominent among these are the industrial settlements at Papworth and Preston Hall and the training-school for boys at Burrow Hill. To be suitable for a settlement, a patient must be able to earn a wage sufficient to support himself and dependents, if any. He therefore must be able to work a full day and be technically efficient. He must also have character. McDougall estimates that not over 4 per cent of admissions really prove suitable. Burrow Hill, which does not attempt to settle, obtains 30 per cent of successes. The Spero Workshops, like Papworth and Preston Hall, attempt to run a business on commercial lines and pay trade wage-scales. Their contribution is limited and achieved at the expense of much work and worry. Handicraft classes are now held in 15 boroughs, those at Woolwich and Deptford being of special importance. *Rehousing:* A growing factor in after-care policy is the rehousing of overcrowded households containing an active case of tuberculosis. This usually means translation from a slum district to a new suburban estate. The principle of letting such houses to a tuberculous family is not universally approved. However, the experience of Londoners at the new Dagenham estate is encouraging. Transportation difficulties for workers and lack of nearby cheap markets are two real disadvantages. *Other functions:* The Council assists in boarding-out children in close contact with infectious patients and to send away mothers for treatment. Borough Councils may incur expenditures for extra nourishment upon proper recommendation, and arrange with School Care Committees for school meals. The London County Council has also recently arranged to provide clothing on loan to patients in or going to institutions.—*The After-Care of the Tuberculous in London, N. D. Bardswell, Tubercle, April, 1936, xvii, 289.*—(*A. P.*)

Psychosis and Pulmonary Tuberculosis.—Insanity among the tuberculous is mostly of the catatonic type. A hallucinatory type and those with simple delirium

are relatively rare. Up to the present it has not been definitely demonstrated that tuberculosis may act as a causative factor in insanity, and a tuberculous psychosis as a symptomatic psychosis has been generally denied. In 9 cases of schizophrenia the development of an acute progressive tuberculosis was observed; and in all of these cases the catatonic symptoms, which developed after the tuberculosis had become manifest, were probably the result of a tuberculous toxaemia. Referring to the usual modern concept as to the aetiological importance of intoxication in causing psychoses, the author assumes in his 9 cases that the tuberculosis acted as the causative factor in producing the psychosis. With the development of a florid tuberculous process, with tissue destruction and signs of toxaemia, these cases developed a symptomatic psychosis, while the majority of the inmates ran true to form.—*Über die Beziehungen zwischen Tuberkulose und Psychose, H. Stefan, Klin. Wchnschr., May 25, 1935, xiv, 754.—(F. G. K.)*

Tubercle Bacilli Absent in Dementia Praecox.—Previous publications have shown negative cultural findings of tubercle bacilli in the blood and cerebrospinal fluid of cases of dementia praecox. In view of the fact that this does not necessarily exclude the tubercle bacillus as an aetiological factor in dementia praecox but supposing the bacillus to be present in a filterable form and consequently detectable only by animal experimentation, a series of guinea pigs were inoculated with cerebrospinal fluid and blood from these cases. Twenty-nine specimens of blood and twenty-seven of spinal fluid and two brain specimens were examined. Ten blood specimens from human cases of tuberculosis and two from experimental tuberculosis in guinea pigs were examined as controls. The specimens were inoculated intramuscularly into guinea pigs, which were then treated with an acetone extract of tubercle bacilli, according to the method of Valtis and Nègre. The animals were observed and tuberculin-tested up to seven months; and upon autopsy their organs were examined microscopically and culturally and were reinoculated into successive guinea pigs as far as the fourth and fifth generations. In this way 311 animals were used. In no case of dementia praecox could tubercle bacilli be detected. In the control animals two yielded positive results. Tuberculosis may be excluded as an aetiological factor in dementia praecox.—*Sur les relations entre démence précoce et la tuberculose. Controle du sang, du liquide céphalorachidien et du cerveau des déments précoces par l'expérience sur l'animal, A. Beck, Compt. Rend. Soc. Biol., October 19, 1935, cxx, 311.—(M. T. W.)*

Fistula-in-Ano.—It is doubtful if foreign bodies account for more than a very small percentage of cases of fistula-in-ano. They consist mostly of fish and rabbit bones, pieces of wood and metal and seeds. A small neglected fissure is liable at any time to penetrate the muscular wall of the rectum, resulting in a small direct fistula with its internal opening at the base of the fissure. The suppuration of anal glands is the commonest cause of all. These glands occur near the lower end of the anal canal as tubular, branching structures, passing into or through the muscular coat and ending in connective tissue. They often pass through the internal sphincter and terminate in the ischiorectal fossa. These vestigial glands, which correspond to the odoriferous glands in certain animals, act as a path for infectious organisms to reach the connective tissues. Congenital cysts occur at the site of the postanal dimple, which is present in 20 per cent of human beings, suppuration resulting from trauma or excessive growth. They always occur just over the tip of the coccyx, and the presence of hairs is conclusive. Such cysts must be completely removed or they will reform. Tubercle accounts for about 20 per cent of all cases of fistula-in-ano. Tuberculous fistulae are distinguished by undermining of the skin, thin serous discharge, and bluish or purplish coloration. The vast majority are secondary to pulmonary tuberculosis. It is useless to search for tubercle bacilli in the purulent discharge, and either guinea-pig inoculation or biopsy of the wall of one of the tracts, together with special staining, is the only method of proving the diagnosis. Injury and trauma cause a variable proportion of fistulae, and include the injection treatment of piles faultily carried out, and the insertion of radon seeds or radium needles near the rectum for carcinoma. In practically all cases the initial lesion is an abscess. If this is opened early and free drainage established either externally or internally, about 70 per cent of cases will heal without fistula-formation. Tuberculous fistulae should be conservatively treated. Drainage of the tracts should be established by the simplest method, and the patient at once sent to a sanatorium or put under proper hygienic conditions, local treatment being entirely subordinate. When the patient is in good condition, the fistula can be treated in the usual way, but a diathermy knife or actual cautery is preferable to the scalpel, in order to minimize a dispersion of bacilli into healthy parts.—*Fistula-in-Ano, J. P. Lock-*

hart-Mummery, Lancet, March 21, 1936, ccxxx, 657.—(A. P.)

Trauma of Lung.—Pulmonary trauma is probably not uncommon, even without external evidence of injury, such as bruises, muscular haematomata and fractured ribs. Hence, lung damage by external violence assumes a place of importance in clinical and forensic medicine and offers a problem in physics inviting investigation. Textbooks of medicine give scanty notice to violence in the causation or exacerbation of pulmonary disease, although some reference is made to its rôle in pneumonia and tuberculosis. Cooke, in 1934, attempted to classify lung injuries from a clinical standpoint. In his *pneumothorax type* there is simple rupture of a few alveoli and the visceral pleura, without necessarily such evidence of injury as haemoptysis or haemothorax. In *parenchymal rupture*, this may result in either bronchopulmonary haemorrhage or subpleural ecchymoses and bruises. In a *combined type*, there may be both haemorrhage into the lung and pneumothorax or haemopneumothorax. Physical explanation of the variations observed is difficult. It is assumed that the lungs must be in inspiration and the glottis closed. None of these cases showed fractured ribs or external bruises. The fact that extensive visceral damage can be produced without external evidence is important. The possibility of a reactivation of latent tuberculosis or a renewed rapid progression of an active lesion is obvious. Also, it is often difficult to convince judges and juries that bruises are not necessarily present in cases of violence and that they bear no necessary relation to the severity of the violence.—*Pulmonary Trauma, W. E. Cooke, Brit. M. J., March 7, 1936, no. 3922, 461.—(A. P.)*

Rupture of Diaphragm.—The term, *rupture of the diaphragm*, should be reserved for those cases in which loss of continuity of this structure is the result of sudden increase in intraäbdominal pressure following trauma or violent effort. This definition excludes stab- and puncture-wounds of the diaphragm, whether by foreign bodies or by costal fragments. A distinction should be drawn between true rupture of the diaphragm and hernia of the diaphragm. Rupture of the diaphragm occurs chiefly in healthy young adult males, and rarely in infants or old people. Most frequently it is by contusion; much less common are ruptures by effort. Predisposing factors include congenital defects in the diaphragm, and tumors and inflammations of that structure. A very full stomach will also predispose to the condition. Experimental work done on cadavers indicates that an open glottis, at the time of the effort of trauma, is almost a prerequisite for rupture of the diaphragm, and further that relaxation of the abdominal muscles favors it. In 126 out of 146 cases rupture occurred unilaterally on the left side. This predisposition may be due to the fact that the viscera on the left are pneumatic, and are thus better suited to transmit increases in intraäbdominal pressure than is the liver. Also, these organs are more easily forced into the thoracic cavity. It is not unlikely that small ruptures of the right side of the diaphragm pass unnoticed because they are susceptible to spontaneous healing. This cannot occur when herniation has taken place. Ruptures may be tendinous, muscular or musculotendinous. True ruptures of the diaphragmatic muscle are very rare, most such cases being the result of tears in it by fragments of ribs. Rupture may occur at the normal hiatuses in the diaphragm, but not commonly. The most frequent site of true rupture of the diaphragm is at the costophrenic insertion, and more particularly at the anterior and posterior axillary lines. This may be due to the fact that the greatest strain occurs here when the base of the thorax enlarges as a result of the increased intraabdominal pressure. Indeed, in certain instances herniation between the ribs may occur. Aside from its frequency and lateral situation, this type of rupture of the diaphragm is characterized by its frequently large size (10 to 35 cm.), its tendency to gape, and its close proximity to the ribs. This last-named fact favors the surgeon when repairing small lesions, for he can support his sutures on the ribs, but in cases with large rents the rigidity of the ribs often makes it difficult to approximate the edges of the rupture. Occasionally the diaphragm may rupture at its anterior border under the xiphoid process. In these cases the peritoneum, pleura and pericardium may all be involved. Ruptures posteriorly situated are not common, and usually involve the oesophageal hiatus. These usually partake of the nature of spontaneous hernias. Lastly, rupture may occur at the orifice of a congenital hernia. The symptomatology of rupture of the diaphragm is much like that seen following any severe trauma to the abdomen. Shock is common, and severe. The patient will usually complain of extreme abdominal pain, and may even state that he feels as though his stomach were in his chest, or that he feels as though something inside of him had been torn. His face may bear the *rises sardonicus*. Respiration is usually rapid, shallow and painful. Deep inspira-

tion is impossible. Even after shock has disappeared the pulse will be very rapid. There may be painful, nonproductive cough. "Dry vomiting" is almost pathognomonic of the condition. There may be some rigidity of the abdominal wall on the side of the lesion. Unilateral thoracic immobility and bizarre physical findings at the lung bases are suggestive. In ruptures associated with lesions of the abdominal viscera or with fractured ribs the clinical picture may be most confusing. Wise practice urges that in all cases of contusion of the abdomen or thorax a roentgenographic examination be made. Simple fluoroscopy or anterior and lateral films are sufficient. Under no circumstances should barium be given or any special procedures be indulged in. They are dangerous. Symptoms of old rupture of the diaphragm are essentially those of diaphragmatic hernia. The treatment of rupture of the diaphragm consists in waiting for shock to subside before attempting repair. Even though one must operate immediately to repair some other ruptured viscus the diaphragm should be left alone for a period of two to three weeks. Immediate phrenicotomy is of great value. This will put the involved side at rest, thus relieving much of the patient's painful symptoms and facilitating later operative procedures. The choice of approach is dictated by the individual case. Speed in operation is more important than a perfect repair. Fancy plastic operations are to be discouraged. The time required for them jeopardizes the patient's life. Anaesthesia is best administered by the positive-pressure method. If this cannot be done it is advisable to do a preoperative pneumothorax. —*Les ruptures du diaphragme, H. Constantini & M. Bonafos, Arch. Med. Chir. l'App. Resp., 1936, xi, 115.*—(*C. L. D.*)

Eventration of Diaphragm.—Although the term is a misnomer and is incorrectly used, it has come to mean a congenital or, occasionally, an acquired high position of one leaf of the diaphragm, characterized by aplasia or atrophy of the muscle fibres, with no break in the continuity of the muscle, and in most cases producing symptoms suggesting gastric, cardiac, pulmonary or pleuropulmonary origin. It should be distinguished from high diaphragm resulting from paralysis of the phrenic nerve. The condition appears to be congenital or acquired. In support of the congenital theory are the relative frequency on the left side (165 of 183 reported cases); frequency in the foetus, newborn and children; associated congenital anomolies; and absence of symptoms for a long time. For the theory of acquired origin, the following causative factors have been given: trauma, acute infectious diseases, pulmonary tuberculosis, subphrenic abscess, mediastinal tumor, chronic gastric disturbances, nontraumatic lesions of the phrenic nerve, pregnancy, thoracic growths, aneurysm and subdiaphragmatic hydatid cyst. Pulmonary tuberculosis has been noted in a number of cases, but the exact relationship has not been definitely established. Only 4 cases in 16,504 roentgen examinations are mentioned at the Massachusetts General Hospital. It appears to be more frequent in males than females. The diaphragm, definitely elevated, may be a layer of fibrous tissue containing a few muscle fibres, or a thin aponeurotic sheet. The phrenic nerve on the affected side has been described as reduced in size but containing normal fibres. The lungs show no compression, but abnormally lobulated lungs are reported. The heart is usually displaced. A great variety of associated disease and congenital conditions are mentioned. Symptoms are varied, not characteristic and may be respiratory, gastrointestinal, circulatory and general. Thoracic and abdominal symptoms are most frequent. Typical but nonpathognomonic physical signs are mild or severe labored breathing, diminished tactile fremitus, displacement of the heart, and absence of the normal percussion note over the base of the lung on the affected side. There are no pathognomonic roentgen signs. A differential diagnosis must be made from hernia of the diaphragm, pleurisy with effusion, thickened pleura, intrathoracic stomach, pulmonary tumor, atelectasis, emphysema and neurosis. Prognosis is difficult and must be guarded; as far as life is concerned, it is usually good, but it is a disabling disease in many persons. Medical management is the treatment of choice and consists primarily of absence of physical exaction, hygienic and dietetic measures. Surgical intervention apparently offers little hope of cure. A review of eventration of the diaphragm has been given with the addition of two new cases.—*Eventration of the Diaphragm, J. A. Reed & D. L. Borden, Arch. Surg., July, 1935, xxxi, 30.*—(*L. F. B.*)

Fracture of Ribs From Coughing.—In a series of 1,903 tuberculosis patients admitted to the sanatorium over a five-year period, fracture of the ribs during the course of the pulmonary disease occurred in 30 patients, 23 women and 7 men, between the ages of 18 and 47. The fractures occurred in one or several of the ribs from the 5th to the 11th inclusive. In no instance were fractures of the upper 4 ribs found. The fractures were single in 17 instances and

multiple in thirteen, unilateral in 26 instances and bilateral in four. The highest number encountered in any one patient was four, the result probably of a series of accidents. The majority of the fractures occurred at approximately the junction of the anterior and middle thirds of the rib. Pain, though not severe, was an almost constant symptom and, like the characteristic pain of pleurisy, was aggravated on inspiration. The nature and location of the pain, and the absence, with few exceptions, of any displacement of the fragments on physical or radiographic examination, usually led to the erroneous diagnosis of pleurisy. In the cases cited, infection played no part in the causation of the fractures. It seems justifiable to assume that the fractures were brought about by muscular violence during coughing. The ribs are fractured more frequently than are the other bones of the body by muscular violence. The accident is not uncommon and occurs "especially in the consumptive," as stated by Stimson in 1883.—*Indirect Fracture of the Rib in Pulmonary Tuberculosis, E. C. Richardson, J. Am. M. Assn., May 2, 1936, cvi, 1543.*—(*G. L. L.*)

Early Diagnosis of Bronchiectasis.—In a series of 100 cases of bronchiectasis, 52 patients were males and 48 females. Seventy-seven were under 30 years of age at first observation. In forty-one the disease involved the left lung, in twenty-three the right lung, and in thirty-six it was bilateral. Fifty patients had symptoms of less than five years' duration, forty-seven of more than five years, and in three the duration was indeterminable. The onset is in early life. Seventeen patients whose ages varied from 4 years to 54 had had symptoms since infancy (17 per cent); 80 per cent dated symptoms from the first decade. In 45 patients onset was secondary to infection of the respiratory tract; in twelve it followed an infectious disease of childhood. The symptomatology and bacteriological observations are not distinctive. Of 66 patients in whom the accessory sinuses were examined roentgenographically, 86 per cent showed evidence of inflammatory change; in 24.2 per cent changes were marked. Roentgenographic and bronchoscopic examinations are essential for early diagnosis. Characteristic pneumonographic changes are necessary for indisputable proof of the existence of the disease. When direct roentgenographic examination is suggestive of bronchiectasis and the bronchoscopic and pneumonographic changes are indefinite, the patient should be kept under close observation and the examinations repeated.—*The Importance of Early Diagnosis in Bronchiectasis: a Clinical and Roentgenologic Study of One Hundred Cases, J. T. Farrell, Jr., J. Am. M. Assn., January 11, 1936, cvi, 92.*—(*G. L. L.*)

Serial Bronchography in Suppurative Pneumonitis.—The nasal fossa, pharynx, and larynx are anaesthetized, and iodized oil passed through a rubber catheter under roentgenoscopic control. Using the selector, plates are taken at different intervals from the large bronchi to the pulmonary alveoli. In the acute stage of lung abscess the bronchograms show normal branches of a tree but no leaves. This is the picture in any acute pneumonopathy. When elimination begins the cavity with fluid-level and the alteration of the draining bronchus may be seen. As the surrounding pneumonitis subsides, the roentgenographic tree acquires leaves. The dead-tree picture is produced by the iodized oil in the cylindrically dilated bronchi, but blocked from the small bronchi and alveoli. The bronchi may show cylindrical, ampullar, sacculiform or combinations of these dilatations. The bronchus draining the abscess may even be normal, but there is almost always bronchiectasis in the corresponding base. In a bronchiectatic abscess the roentgenogram usually shows a larger central cavity and smaller sacculiform cavities around it, while in suppurating bronchiectasis all the cavities are more uniform in size. Bronchial cancer may produce a large cavity which fills with the iodized oil but shows no bronchiectasis because there is no surrounding area of fibrosis. However, the carcinomatous cavity may not fill, but displace the whole bronchial tree at this level. Roentgenograms and bronchograms are given to illustrate these points.—*Serial Bronchography in the Diagnosis of Suppurative Pulmonary Processes, P. L. Fariñas, Am. J. Roentgenol. & Rad. Ther., November, 1935, xxxiv, 579.*—(*E. M. J.*)

Progressive Idiopathic Pulmonary Fibrosis with Emphysema.—These cases, one of which is reported in some detail, are presented because often misinterpreted as pulmonary tuberculosis. Sometimes asthma, heart disease, malignant tumor and pneumonoconiosis are confused. Unfortunately, even a complete pathological examination may not reveal the aetiology, but in general the necropsy findings are those of diffuse interstitial fibrosis, distortion and dilatation of bronchi, diffuse emphysema and, in advanced cases, emphysematous blebs. The X-ray picture is extraordinarily like that of pulmonary tuberculosis, but the disease is less localized. Emphysematous blebs may simulate cavities. Pleural thickening or ef-

fusion are common. A diffuse honeycombed appearance is produced by the thin-walled dilated bronchi and confluent emphysematous alveoli. Cavities, when they occur, are multiple and molded to one another. They may be best seen on oblique or lateral view. Diaphragmatic outlines and excursions are usually abnormal. The condition is progressive and shadows do not clear or disappear as in tuberculosis.—*Progressive Idiopathic Pulmonary Fibrosis Associated with Emphysema, A. O. Hampton, Meeting Mass. Med. Soc., June 5, 1935, reported in New England J. M., December 12, 1935, ccxiii, 1174.*—(*A. P.*)

Massive Collapse Complicating Haemoptysis.—A lad of 18 was admitted, October, 1934, to Westminster Hospital, London, with a history of initial haemoptysis in August. Atelectasis apparently developed during and following repeated further haemoptyses, and involved the left lung. It persisted several weeks and gradually disappeared. Physical and X-ray examinations and bronchoscopy were negative. Definite symptoms of pulmonary tuberculosis recurred early in 1935, with positive sputum, and sanatorium treatment and artificial pneumothorax were carried out. Massive collapse after haemoptysis is infrequently diagnosed, although it is probably not uncommon. Such patients are mostly too ill to be subjected to exhaustive clinical and roentgenographic examination, and some of the manifestations are mistaken for changes due to old fibroid tuberculosis. Most authors assign mechanical bronchial occlusion by a blood-clot as the causative factor, a view supported by the fact that reinflation of the collapsed lung does not occur until the offending clots are expelled. Benedetti, however, believes that all varieties of massive collapse are due essentially to active contraction of lung tissues, especially the smooth muscle of the respiratory bronchioles, from reflex nervous stimulation, and that, following bronchial spasm, there is progressive absorption of alveolar air. Most cases occur in patients with early pulmonary lesions. The observations of Jacobaeus and Westermark are confirmatory. In most of their cases haemorrhage was large and in many it was an initial symptom of tuberculosis. Jacobaeus showed that spasm occurred particularly in patients with healthy bronchi. Lipiodol rarely induced collapse in diseased lungs, but in three of eight healthy individuals massive collapse ensued. With complete mechanical obstruction alone, collapse did not occur for four to six hours. Most reported cases (following haemoptysis) have occurred in young adults, more often men, pulmonary tuberculosis being the chief causative agent. A few have been reported associated with such other conditions as mitral stenosis, vascular hypertension, and bronchial tumor (Morlock and Pinchin); also "idiopathic" haemoptysis during menstruation in young girls. The areas of collapse vary greatly in size and location. The symptoms are often masked by those of the haemorrhage, develop within twenty-four hours, and resemble those of postoperative collapse. Dyspnoea, cyanosis, and chest pain are common. Flattening and diminished movement of one side are usual, and either diminished, absent or tubular breathing; also, displacement of heart and trachea toward the affected side. The X-ray picture is characteristic, with a dense homogeneous opacity, narrowing of the hemithorax and intercostal spaces and increased obliquity of the ribs; also, elevation of the diaphragm and mediastinal displacement, homolateral. When therapeutic pneumothorax is attempted, Jacobaeus and others have found unduly marked negative intrapleural pressures (−30 to −40 cm. water). In most cases the cause of the haemoptysis has been revealed with the disappearance of the X-ray shadow of atelectatic lung. Reëxpansion is usually complete and the immediate prognosis good. Artificial pneumothorax has been recommended by Jacobaeus, Wilson, Glenn and others; it usually relieves the acute symptoms and favorably affects the tuberculosis. In diagnosis, the condition must be differentiated from bronchopneumonia, which carries a bad prognosis. In pulmonary tuberculosis there may occur a chronic as well as acute collapse of a lobe or lung, due to bronchial stenosis. This must be differentiated from pulmonary fibrosis. The best method of distinction is by inducing artificial pneumothorax, the characteristic high negative pressure being registered with atelectasis. The possibility of a bronchial neoplasm as a factor may have to be ruled out by bronchoscopy. In this paper, 41 cases collected from the literature are tabulated in some detail.—*Massive Collapse of the Lung Complicating Haemoptysis, J. Mindline, Brit. M. J., December 21, 1935, no. 3911, 1201.*—(*A. P.*)

Bilateral Spontaneous Pneumothorax.—The course of a case with an idiopathic spontaneous bilateral pneumothorax is discussed. From a consideration of the nature of the air-vesicles, it was probably a case of acquired bronchiectasis, foetal bronchiectasis, or congenital cystic lung, and of these the latter seemed the most probable. The pneumothorax probably oc-

curred through the rupture of some of the emphysematous vesicles, which were in communication with the bronchial system.—*A Case of Bilateral Spontaneous Pneumothorax, Probably Caused by Rupture of Air-Vesicles in the Lungs, B.-E. Wallinder, Acta. Tuberc. Scandinav., 1936, x, 66.*—(*F. B. S.*)

Interlobar Pleural Effusions.—Encapsulated pleural effusions in the costophrenic angles, the anterior and posterior mediastinal aspects of the pleurae, the retrocardiac area, and the interlobar fissures (including the azygos fissure on the right side) may be difficult to detect on physical and the usual roentgenographic examination. They may account for so-called mild and atypical pneumonic processes, unresolved pneumonias, and some intrathoracic neoplasms which disappear miraculously. In interlobar pleurisy there are slight chills, a moderate amount of fever, constant dull chest pain not particularly aggravated by the respiratory effort, a distressing cough but no bloody sputum. The symptoms may be even more mild and, if occurring in a patient past middle age, are likely to be considered as due to neoplasm. The roentgenological evidence may be that of pulmonary consolidation, but physical signs are absent or limited to harsh breathing and, rarely, small moist râles. In interlobar pleurisy the roentgenological findings persist longer, the leucocytosis and preponderance of neutrophiles is less marked, and there is not the sharp drop in temperature seen in lobar pneumonia. The best diagnostic evidence is a roentgenogram, showing the interlobar fissure at right angles to the film and with the involved side next to the film. The right upper interlobar septum is often demonstrated in routine roentgenograms since the anterior aspect of the fissure is at right angles to the film. Although this is true, the right lateral position is best for showing effusions in even this fissure. Rare neoplasms, arising in the parenchyma and growing in globular fashion near the centre of the lobe or originating in the hilar structures and growing outward, may be confused with interlobar effusion. If lateral films show these supposed tumor shadows to be intimately connected with an interlobar fissure, time and patience may prove them to be effusions which slowly but surely disappear. Case histories and roentgenograms are given.—*Interlobar Pleural Effusions, B. P. Stivelman, Am. J. Roentgenol. & Rad. Ther., October, 1935, xxxiv, 475.*—(*E. M. J.*)

Acute Empyema.—Experimental studies and clinical observation on acute empyema with suggestions as to methods of treatment are presented. Reëxpansion of the lung on the affected side was delayed or prescribed by thickened pleura, and in the experimental work it was found in some cases that a pressure sufficient to rupture the alveoli did not reëxpand the lung. It was noted in the acute stage that hyperplasia of the subpleural alveolar epithelium occurred. This is described as part of the pathology of certain diseases of the lungs, and observations in one human case indicates that it may occur with this type of empyema. These observations supply further evidence that the alveolus of the lung is actually lined with epithelium.—*Acute Empyema Thoracis, H. A. Carlson, J. Thorac. Surg., April, 1936, v, 393.*—(*L. F. B.*)

Oil in Lung.—Three adult cases are reported, in which pulmonary changes occurred, following the prolonged or intensive use of mineral oil in the respiratory tract. In all of these cases oil droplets were constantly found in the sputum. Unusual X-ray findings were noted. There was a miliary mottling in the areas involved. On close examination, this was found to be due to accentuation of the finer lung markings. Serial films showed definite progressive retraction in the size of the lobes involved with solidification where the involvement was most severe. Accompanying this is a compensatory emphysema of the upper lobes. Generally the lung fields nearest the cardiohepatic angle show the greatest density. In a case which came to autopsy, oil droplets were visible on the cut-surface of the fibrotic lung, the last instillation in this case occurring over six years before. Attention is called to the fact that the vegetable oils produce little reaction in the lung.—*Roentgenographic Changes Following the Introduction of Mineral Oil in the Lung, K. S. Davis, Radiol., February, 1936, xxvi, 131.*—(*G. F. M.*)

X-Ray Changes in Lungs of Electric Arc Welders.—Among 16 electric-arc welders, all apparently healthy and actively working, and nearly all young men, apprenticed at 14, the X-ray films of six showed a diffuse generalized mottling throughout the lung fields, and none appeared entirely normal. Some of the definitely positive cases showed crepitations at the lung bases on physical examination. Three cases classified as "suspicious" showed some nodular stippling and exaggerated markings in the films and even a suggestion of mottling in one. The "negative" ones showed slight stippling in certain areas and abnormally prominent markings. None showed abnor-

mal physical signs. The diagnosis of the underlying pulmonary lesions in these cases is important but highly speculative. There is little doubt that the dust or fumes inhaled played an aetiological rôle. During welding operations, dense white or grayish-white fumes rise continuously and, in the absence of protective measures, large quantities cannot fail to be inhaled. The electrodes or welding rods, containing a metallic core and an outer covering, are gradually consumed by the heat generated. The metal of the core becomes molten and, assisted by the flux of the covering, spreads over the surface of the metal welded. The basis of most of the coverings is sodium silicate, some containing asbestos, which sometimes completely covers the rods, and at others is wound spirally. The composition of the fumes has yet to be fully investigated. The particulate matter, collected in an Owen dust-counter, consisted in one instance of iron-oxide particles and occasional asbestos fibres. The X-ray appearance is not that of asbestosis. In only one instance was the diaphragmatic or cardiac outline blurred or the line of the interlobar septum seen. The upper lung fields appear more affected than the lower. Generally, the appearance is more suggestive of silicosis, but the men present no symptoms or incapacity for work, with one exception; none are dyspnoeic, and none have pulmonary tuberculosis. It is suggested that nitrous fumes, together with fine iron-oxide dust, may set up small areas of chronic inflammation, congestion or fibrosis in the lungs, or even that the particulate particles may be visualized by the X-rays.—*X-ray Appearance of the Lungs of Electric Arc Welders, A. T. Doig & A. I. G. Mc Laughlin, Lancet, April 4, 1936, ccxxx, 771.*—(*A. P.*)

Roentgenology of Pneumonoconiosis.—The antemortem and postmortem roentgenograms are correlated with the pathological changes in various unclassified types of pneumonoconiosis. To facilitate this attempt, the field of pneumonoconiosis is divided into a convenient and logical working classification, based chiefly on the type of pathological change, combined with the causative agent. Four main divisions are listed as follows: (1) coniofibrosis, including silicosis, silicotuberculosis, asbestosis and the like; (2) coniolymphostasis, including anthracosis, siderosis and the like; (3) coniotoxicosis, including protein sensitization, direct irritation and other causes; and (4) mixed processes, such as anthracosilicosis, sidero-silicosis, anthracosilicotuberculosis and other conditions. Coniofibrosis may be considered as a form of pneumonoconiosis characterized by an exuberant growth of connective tissue due to a specific irritant. In silicosis the action is viewed as that of a toxic irritant. Whether it is a direct poison acting on the cells or an indirect one due to the solubility of the silica has not been established. Whorls of fibrous tissue develop. The stage of the disease depends on the location and number of these nodules. After the entrance of the tubercle bacillus into a silicotic process, the character of the silicotic nodule changes depending on the time of appearance of the infection and the dosage of bacilli. The longer the tuberculosis exists as a widespread process, the fibrils of the whorls become blended into one mass, and the whole nodule gradually takes on the appearance of a caseous nodular tubercle. As the process advances, it becomes more and more like a tuberculosis, until the roentgenograms are typical of this disease. If there is a benign tuberculosis already present, the process tends to become more exaggerated in the regions of the tuberculous lesions. In addition to the variations in the lung parenchyma, there are changes in the lymph nodes that are characteristic. Here there is an "egg-shell" infiltration of calcium underneath the capsule. The pathological disorder in asbestosis is not a nodule as in silicosis but rather a diffuse fibrous lobulitis. The process extends out from the hilum toward the base. While asbestosis is not so prone to become tuberculous as silicosis, it does possess this hazard. The second main group, coniolymphostasis, includes only dusts that act principally by blocking the lymphatics until their normal physiological function is so impaired that normal resilience is lost, lymph-drainage is impaired, and acute infections readily occur. In the pure inert dusts there is rarely any fibrosis, especially nodules or whorls. In the worst types the lymphatics are completely blocked and are essentially functionless. The third group, coniotoxicosis, is somewhat apart from the other types in that the irritants affect the tissues directly or after a period of sensitization to a specific protein. Most of these are acute processes, such as a bronchitis or a pneumonitis. The shadows reveal a distribution similar to uncomplicated silicosis, but the lesions are soft and irregular and conform to the acini similar to an acute bronchogenic spread of tuberculosis. As illustrative of the fourth group, in most coal-miners there is a mixed process that has been termed anthracosilicosis. In general, there is a rapid accumulation of carbon with a gradual development of silicosis, which seems to be greatly retarded by the coal-dust. The roentgenogram shows first an increase in the thickness of the hilum lymph nodes and

of the peribronchial and perivascular lymphatics due to the dust. Later, nodules begin to appear which vary in size from a few millimetres to many centimetres. The inert dust seems to alter the circulation in the tissues, so that a partial atelectasis results, to be followed by fibrosis, resulting in fibrous tumor, composed of fibrous tissue with phagocytes laden with dust in between the fibres. In the ordinary coal-miner with low silica the terminal condition is usually bronchitis or pneumonia, but in the lead- and zinc-miners of the Ozarks, where the carbon pigment in the quartz is low compared to the silica, the result is a moderate anthracosis with a strong silicotic tendency. Sooner or later they are usually contaminated with the tubercle bacillus.—*Pathologic Interpretations of Roentgenologic Shadows in Pneumoconiosis, H. C. Sweany, J. Am. M. Assn., June 6, 1936, cvi, 1959.*—(*G. L. L.*)

Asbestosis.—Asbestosis is distinct from silicosis in its pathology and clinical features. A search of all the death-records on file in the Metropolitan Life Insurance Company revealed that asbestosis had been given as a cause or contributing cause of death in only 19 cases, fifteen of which have occurred since 1933. The clinical picture of asbestosis is milder than that of silicosis. The author did not find in communities in which asbestos was mined or fabricated the familiar picture of disability and tuberculous infection so characteristic of hard-rock mining communities. In only one case was there evidence of active tuberculosis, as based on the roentgenography. Several showed healed tuberculosis. The author's data are based on 126 physical examinations of asbestos workers, all of whom had more than three years' exposure and were selected at random. Sixty-three of these presented roentgenograms thought to indicate pneumonoconiosis, but the symptoms were indefinite and inconclusive. These cases were called first-stage. Four presenting evident pulmonary symptoms and corroborative roentgenograms were termed second-stage. Of these 67 patients, twenty had been exposed more than ten years, and thirteen more than fifteen years. As in silicosis, the diagnosis centres on the roentgenogram. The X-ray appearances are not clear-cut or distinctive, as in silicosis, and do not lend themselves to ready grouping into progressive stages. There are less evident pathological changes, and the shadows are finer, more granular, and softer than in silicosis. The asbestosis film gives the impression of ground glass, and there is no nodulation with the consequent tendency of the nodules to coalesce and give dense opaque areas in the films. The distribution of the shadows is somewhat different, occupying the lower third of the lung, except in far-advanced cases, when the shadows may occupy the major portion of the lung. The exact significance of asbestos bodies in the sputum is doubtful, but it is commonly agreed at the present time that they are not diagnostic of pulmonary fibrosis and indicate merely that the individual has been exposed to asbestos dust. It is not certain that asbestosis progresses as does silicosis after withdrawal from dust exposure, nor does infection seem to be as closely and intimately associated with asbestosis as with silicosis.—*Asbestosis, A. J. Lanza, J. Am. M. Assn., February 1, 1936, cvi, 368.*—(*G. L. L.*)

Tissue Changes from Colloidal Silicic Acid.—Maximum tissue changes in a silicotic lung do not occur at the sites where relatively large particles of quartz can be demonstrated. This may be due to the passing of the quartz crystals into a colloidal state, which can occur only in a slightly alkaline medium, and then, on reaching a slightly acid medium, the crystalline state returns. On the other hand, the tissue juices may digest the quartz into finer particles by a sort of corrosive process. The author believes that both processes may occur. Assuming that the changes found in a silicotic lung were on a physicochemical rather than mechanical basis, the author injected rabbits intravenously with a pure, stable, water-clear preparation, completely electrolyte-free, containing 0.25 gm. of silicic acid per 100 cc. The rabbits received 1 cc. daily, and, in later experiments, 2 cc. Those receiving 2.5 mgm. daily for six, eight and twelve weeks were killed at the end of these various periods of time. They were all found to have enlarged spleens and livers, those receiving the most silicic acid having the largest, which were of very tough consistency. Microscopic findings in the liver of an animal treated for six weeks were significant. There was a marked increase in interstitial tissue, with swelling of the walls of the bile capillaries, and decrease in the size of the liver cells, which often made it difficult to differentiate them from the interstitial and capillary-wall cells. Between the endothelium of the capillary walls and the liver cells proper were spaces lightly streaked or completely filled with a homogeneous substance which stained red with eosin. Generally this appearance was accompanied by a marked increase in the cellular elements. The Kupffer cells were increased in number and size, and appeared as large, finely vacuolated cells, rich in protoplasm. These changes were most marked

near the central vein. In certain regions there was no evidence of pericapillary oedema, but the endothelial elements were swollen and increased in number, and occasionally sinus-like outpouchings of the capillary walls were present. The pericapillary areas noted above stained red with Van Gieson's stain, but without evidence of collagenous fibrils. The liver of a rabbit treated for eight weeks showed all the above changes. In addition to these, young connective-tissue cells were so abundant that the structure of the liver was in places difficult to make out. A development of collagenous fibres had taken place, and the parenchyma was much reduced in amount. What remained stained poorly and tended to blend with the collagen. In the rabbits treated for twelve weeks the process had gone still further, and took on the appearance of cirrhosis of the liver. There was no evidence of cellular inflammation, however, nor any hyperplasia of bile-ducts. Connective tissue had replaced the liver cells. There was still an extensive pericapillary oedema, with a tendency to collagen-formation, and an exudate containing a fine fibrillar network lying between the capillary walls and the liver cells. Studies of the spleens from these animals revealed similar changes. There was an increase in the reticulum of the pulp cells, which were unusually rich in protoplasm. The nuclei were often eccentric and irregular in shape. The protoplasm was very light and transparent, and finely and coarsely honeycombed. Swelling and mobilization of the pulp cells, morphologically equivalent to the changes observed in the Kupffer cells of the liver, was present. In those animals treated for twelve weeks there was a significant fibrosis of the reticulum with a tendency to collagen impregnation of the fibrils. There were no changes of note in the lymph follicles of the spleen, but striking changes in the glomerules of the kidneys. In animals treated for only eight weeks there was a high-grade intracapillary glomerulitis, with proliferation of the endothelial elements. The nuclei of these cells were lighter in color than normal and frequently lay at the side of the cell. The protoplasm was light, and contained large vacuoles. At the periphery of the glomerules were collagenous fibres. There was a marked excretion of albumin. In the bone-marrow was a marked oedema, retrogression of the blood-forming elements, and an increase in number and impregnation with collagen of the reticulum fibres. In the lungs there was a slight increase in the supporting structure of the alveolar walls, due to an increase in the number of collagen fibres. In general, there was a mobilization of the endothelial elements, and a high-grade protein-rich pericapillary oedema and exudate. These would lead to a reduction in the parenchymal elements, and a development of sclerosing connective tissue. In silicosis and asbestosis the process of fibrosis is bound up with the presence of colloidal silicic acid, which is a normal and necessary constituent of collagen. Indeed, all of the silicate which the body can change to silicic acid must be utilized to build new connective tissue. This silicic acid is negatively charged, for positively charged colloidal split-products of silicates, such as are present in clay, will not lead to sclerotic changes, and are harmless. That the pathological picture of asbestosis differs somewhat from that of silicosis is explained by the fact that, in the former, silicate is present as fine needle-like crystals which stay where they have originally lodged, thus permitting the dissolved silicic acid to diffuse freely into the tissues. Hence, there is no such high local concentration of the material as there is in and about the lymphatics in silicosis where the fine particles of quartz are readily carried to and block the lymph nodes.—*Untersuchungen zur Pathogenese silikotischer Gewebsveränderungen, F. Koppenhofer, Virchow's Arch., June 18, 1936, ccxcvii, 271.*—(*C. L. D.*)

Squamous-Cell Cancer of Lung with Asbestosis.—If cancer is to be adjudged as of industrial origin, its incidence in a particular occupation should significantly exceed the general rate; and there should be sufficient association of the worker with a substance proved experimentally to be carcinomagenic. The liability of malignant tumor to supervene upon long-standing pneumonoconiosis has been suggested but their precise interrelation is an open question. Two cases are recorded, in women workers, one after eight years' exposure to asbestos dust as a spinner: the other occurred fifteen years after two short periods of six and thirteen months in the mattress and opening departments of the factory. The malignant lesions in each case were small and not recognized during life. In each case, the asbestosis was advanced and of long standing, and the growths were small and circumscribed and with no metastases. They were in a portion of the lung in which asbestosis was advanced. Neither growth nor asbestosis seemed sufficient to have caused death but it is suggested that in asbestosis a small tumor turns the scale.—*Two Cases of Squamous Carcinoma of the Lung Occurring in Asbestosis, S. R. Gloyne, Tubercle, October, 1935, xvii, 5.*—(*A. P.*)

Primary Cancer of Lung.—Primary carcinoma of the lung is one of the most

frequent forms of malignant tumor in adults. The authors have studied 135 cases over a four-year period. Their statistics indicate that it ranks second to gastrointestinal cancer, and constitutes from 6 to 8 per cent of all malignant tumors. About 75 per cent of the cases occur between ages 40 and 60 years. In the series of 135 cases it was twelve times as frequent in males as in females. The right upper lobe is the most common site. The tumors are all bronchogenic in origin, and begin as a metaplasia of the basal epithelial cells. There are three important histological types: (1) undifferentiated round or spindle cell, (2) adenocarcinoma and (3) squamous cell. All types have a marked tendency to produce lymphogenic and haematogenic metastases, but the squamous cell is usually less malignant than the other two types. Of 74 cases that came to necropsy only one presented no metastases. Eighty-eight per cent showed hilar lymph-node metastases, 38 per cent abdominal lymph-node, 40 per cent liver, 32 per cent kidney, 43 per cent suprarenal, 28 per cent bone, and 24 per cent brain metastases. The chief associated lung changes were pleural effusion (47 per cent), bronchiectasis (43 per cent), acute pneumonia (28 per cent), chronic pneumonia (20 per cent), abscess or gangrene (20 per cent), and purulent bronchitis (19 per cent). Only 49 per cent of cases presented changes that were largely thoracic. This important fact explains the present failure in most clinics to diagnose 50 per cent of the cases. The characteristic history of pulmonary well-being to within an average period of eight months before seeking medical aid, the development of bronchitis or recurrent attacks of pneumonia or pleurisy, followed by persistent cough, pulmonary or extrapulmonary pain, haemoptysis, and dyspnoea, should enable the physician to suspect lung carcinoma. The roentgen study alone makes the diagnosis possible in at least two-thirds of the cases. The bronchoscope is of great value in confirming the diagnosis, but most cases can be recognized without it.—*Primary Carcinoma of the Lung: a Diagnostic Study of One Hundred and Thirty-five Cases in Four Years, A. Arkin & D. H. Wagner, J. Am. M. Assn., February 22, 1936, cvi, 587.*—(*G. L. L.*)

Early Diagnosis and Treatment of Cancer of Lung.—The surgical treatment of malignant disease has been based on the complete extirpation of cancer-bearing tissue or of a cancerous organ prior to metastasis and the success of such treatment depends upon early diagnosis and accessibility. It has been demonstrated that either one lobe of a lung or the entire lung on one side can be successfully removed without limitation of the patient's life or activities. Recent advances in such surgical treatment demand that the general medical profession be more concerned with early symptoms and differential diagnosis. In most cases a warning symptom, a persistent cough, appears early; also, most growths originate in a stem-bronchus and can be actually visualized bronchoscopically. Surgery is the more to be considered inasmuch as irradiation in any form fails to cure and often has no favorable influence whatever on these lesions. As the most common type of primary lung tumor is the epidermoid, notably radio-resistant, and sometimes even aggravated or broken down, not much reliance can be placed in such therapy. Bronchoscopic removal is applicable only to very small localized lesions. Efforts at surgical removal have been stimulated by successful experiences with lobectomy for bronchiectasis, notably by Sauerbruch, Churchill, Edwards and Eggers, in the case of a single lobe, and by Nissen, Haight, Windsberg, Graham and Singer, and Rienhoff, in the case of the entire lung, in both bronchiectasis and carcinoma. *Pathology:* Most primary lung tumors are conceded to arise from bronchial epithelium or mucous glands, and the epidermoid form is most frequent. Most writers distinguish two major groups according to location: (1) hilar and (2) peripheral or pneumonic. The latter are more frequently adenocarcinoma. Most epidermoid tumors eventually show mediastinal extension. The majority of tumors originate in a main stem-bronchus near the hilum (65 to 75 per cent). In the earlier stages these often give rise to a mistaken diagnosis of asthma. When they completely occlude a bronchus there is atelectasis, showing a homogeneous triangular shadow on X-ray. *Symptoms and diagnosis:* In a review of the earliest symptoms in 19 cases of bronchogenic carcinoma, cough was reported by all to be an early and persistent symptom, while 12 patients complained of weakness and 8 of haemoptysis. Roentgenographic examination in the early stages may be confusing in that the lesion itself may cast no shadow or one difficult of interpretation because of its close proximity to the hilum. Most abnormal shadows seen on X-ray are due to the secondary effect of the tumor rather than the tumor itself, as, for instance, atelectasis of a lobe. Sputum examination helps to rule out tuberculosis and differentiate lung abscess. Bronchoscopic examination is very important. There is a pneumonic form, showing an area of density with central necrosis, fairly well circumscribed, often progressing to cavitation, with evi-

dence of sepsis. Edwards has reported that 10 per cent of cases diagnosed as pulmonary abscess prove to be broken down neoplasms. In this type bronchoscopic examination is of least assistance. The history and serial X-rays are most suggestive. Among other aids to diagnosis generally are lipiodol and partial artificial pneumothorax. *Operative therapy:* The advisability of this must be determined on the basis of extent of the lesion and the general condition. Preliminary pneumothorax is generally advised, to be maintained seven to ten days. If, on exploration, there are obvious metastases, the operation is not continued.—*Primary Carcinoma of the Lung: Early Diagnosis and Treatment by Pneumonectomy, R. H. Overholt, New England J. M., January 16, 1936, ccxiv, 93.*—(*A. P.*)

Diagnosis of Bronchial Cancer.—A group of 50 cases of bronchial carcinoma were studied from a diagnostic standpoint. Each case was based on histological examination of the tumor tissue. Forty-five of the patients were males; the ages ranged from 21 to 69 years, the greatest proportion occurring between 41 to 60 years of age. The symptoms most frequently complained of were cough, expectoration, pain, dyspnoea, loss of weight and haemoptysis, in the order named. Fever, haemorrhage, dysphagia, and vague respiratory diseases were also noted as initial symptoms. Cough was present in all cases but one, and was the first symptom in over half of the cases, occurring alone or with some other symptom. It was endured for a relatively long time after the onset before medical aid was sought. Pain was tolerated for a shorter time before advice was sought. In over half of the cases the initial symptom had been present for a year before a physician was consulted, and only 25 per cent were seen within six months from the time of onset of initial symptom. The most common roentgenologic finding in bronchial carcinoma is evidence of atelectasis. This is due to obstruction by the tumor, which, like any foreign body, may produce a check-valve or stop-valve type of action. At first, neoplasms probably have a check-valve action, but symptoms produced from this may not be severe. Adults do not seem to suffer greatly from this type of occlusion: only one patient in this series was seen at this stage. Forty per cent of the cases had complete collapse of a lung or part of a lung when first seen. A mass seen in the parenchyma of the lung generally means a new growth, but the exact nature of the tumor cannot be determined from the roentgenogram. If such a mass is near the hilum it may be hard to differentiate from an aneurysm. Such an X-ray finding was present in 24 per cent of these cases. An increase in the pulmonary markings resembling an inflammatory change is an atypical finding in some cases of bronchial tumor. Such findings may be interpreted in the upper lung field as tuberculosis and in the lower as bronchiectasis. Any shift of the mediastinum with such findings should make one suspicious of a new growth. In a few cases there is roentgenological evidence of pulmonary abscess. When it occurs secondary to bronchial carcinoma, there is frequently some displacement of the viscera, which does not usually occur in abscesses secondary to operation or infection.—*Diagnosis of Bronchial Carcinoma. A Clinical and Roentgenologic Study of 50 Cases, J. T. Farrell, Radiol., March, 1936, xxvi, 261.*—(*G. F. M.*)

Removal of Intrathoracic Dermoid Cyst.—A patient, admitted to Victoria Park Hospital, London, complained of cough with sputum, having been referred from a dispensary and sanatorium, where a chest X-ray revealed a shadow suggesting tumor. She also had had a complicating miscarriage in the 6th month of pregnancy, immediately prior to admission. The X-ray film showed an oval shadow on the right side contiguous with the mediastinal shadow, from the 2nd rib above to the lower border of the fifth below, with maximum convexity in the midclavicular line. Laterally viewed, it appeared to be anterior. The fluoroscope showed no pulsation, and further X-ray after lipiodol showed no bronchial distortion or compression. Dermoid cyst was diagnosed, and exploratory thoracotomy recommended. However, a preliminary artificial pneumothorax was induced. At operation an oval mass was discovered contiguous with the mediastinum and anterior to the collapsed lung, of hard consistence, but containing cloudy fluid. It was dissected off the lung superior vena cava and pericardium, and removed, the wound being closed. Recovery was uneventful except for a blood-stained effusion in the pleura necessitating aspiration on the 3rd and 5th days. The walls of the cyst contained muscle tissue, and the interior numerous thin plates of bone, as described by Gloyne. *Discussion:* Tumors, limited to the mediastinum when first discovered, are rare, and a diagnosis of their nature usually difficult. However, a malignant growth of the size of the tumor noted is usually associated with more evidence of ill health and a grayish color is suggestive. Restoration of health following a holiday speaks against malignant tumor. Aortic aneurysm may closely simulate mediastinal tumor due to other cause, and absence of

pulsation is not conclusive, nor is even exploration in certain cases. Next to malignant tumor and aneurysm, a dermoid cyst should be considered, especially if the location is anterior. Neurofibroma is usually situated posteriorly; and lymphadenoma limited to the hemithorax, if it occurs, must be very rare. Operation in the case of a dermoid cyst will prevent further growth and complications.—*An Example of Intra-Thoracic Dermoid Cyst, W. B. Wood, Tubercle, May, 1936, xvii, 364.*—(*A. P.*)

Cystic Disease of Lung.—Eight cases of cystic disease of the lung illustrative of three types of this condition are reported. In case 1 the condition had manifested itself clinically only by infrequent haemoptysis over a period of twenty-nine years. Physical examination of the chest was negative, and the history and roentgenogram gave no evidence of an inflammatory process. There were present several circular and oval cysts bilaterally in the lower lobe of each lung. The largest was 6.5 cm. in diameter, and was filled with fluid blood which was spontaneously evacuated. Because the health of the patient was not impaired, and because there was no recurrence of haemoptysis during the period of observation, pneumothorax was not induced even though it might have led to permanent collapse of the cavity. In case 2 there had been no symptoms until the patient, a woman, was eighteen years old, when she suffered a peculiar "pneumonia" which lasted two weeks, but was without sequelae. Three years later, at three days postpartum, she had a sudden severe pain in the right chest associated with moderate dyspnoea. No other symptoms were present, and the pain and dyspnoea disappeared in twenty-four hours. A roentgenogram was interpreted as showing spontaneous pneumothorax on the right side, and the patient took a ten months' cure for tuberculosis. A few months later she began having infrequent episodes of pain in the right side of her chest with dyspnoea. This persisted for one year when she was admitted to the hospital for study. Physical examination revealed hyperresonance, and diminution of breath-sounds over the entire right lung. The heart and mediastinal structures were displaced moderately to the left. The left lung was clear. A roentgenogram showed an air-space in the right apex, below which were numerous air-cysts, some of which were several inches in diameter. Manometric readings showed negative pressure in the apical air-space, which was probably a localized pneumothorax produced by a ruptured air-cyst. The shift of the mediastinum to the left had been produced by pressure of the previously distended air-cysts with atmospheric or even positive pressure. The pressure in the pneumothorax sealed off the opening and the air was gradually absorbed. The resulting decreased intrapleural pressure permitted spontaneous rupture of adjacent air-cysts into it. This would explain the recurrent pain and dyspnoea. The patient's symptoms did not seem to be severe enough to warrant the injection of iodized poppy-seed oil with the idea of producing an inflammatory reaction which would be followed by closure of the cyst. This has been successfully accomplished by Croswell and King. Three more cases of cystic disease of the lung are described, in which there was extensive pulmonary fibrosis, which had presumably preceded the development of the cysts. These patients were all over forty years in age. The cysts developed from emphysematous blebs formed in the neighborhood of the fibrosis. These cysts were of the bullous type. One patient, case 3, complained of slight productive cough and dyspnoea. Roentgenogram revealed diffuse fibrosis of both lungs and a dense shadow at the root of the right lung. There was nothing to suggest the numerous large thin-walled cysts seen in this lung at autopsy. The patient died of a cerebral accident. The left lung contained no cysts, but showed a tendency to the formation of bullae. Case 4 was that of a person who complained only of a recent haemoptysis and pain in the right side. A diminution of breath-sounds and fine moist râles were present at the right base. X-ray revealed bilateral diffuse fibrosis, and a large bullous cyst in the right lower lobe. Case 5 was one of polycythaemia without pulmonary symptoms. A routine roentgenogram of the chest showed a large air-cyst in the right apex and adjacent to an area of fibrosis. In cases 6, 7 and 8 there had been bronchiectasis and chronic pneumonitis of many years' duration. One case had a transient anaerobic infection in a cyst. Another had a small area of healed tuberculosis in the right lung, with cysts present only in the left. This was confirmed at autopsy. The patient died of erysipelas. The right lung was a fibrous mass, containing innumerable cyst-like cavities communicating with dilated bronchi. There are two main types of air-cysts, those that originate from dilated bronchi and whose walls contain muscle fibres or cartilage, and those which are essentially emphysematous blebs. They may be solitary or multiple. The solitary cysts are rare and are encountered usually in infancy. They are large and are usually fatal in early life. They will rapidly increase in size if there is established a

check-valve type of bronchial opening. Their sudden rupture results in a tension pneumothorax that may end fatally. Multiple cysts vary in size, distribution, type of bronchial communication and contents. They may be congenital or acquired, a distinction which is often difficult to make in adults. Pneumonitis and fibrosis are invariably associated with the acquired form.—*Cystic Disease of the Lung, H. Hennell, Arch. Int. Med., January, 1936, lvii, 1.*—(*C. L. D.*)

Congenital Cystic Lung.—One hundred and forty-seven of these cases have been reported in the literature to date, most of them being of the large solitary type of cyst in which the age of onset is earlier and the prognosis very poor. Symptoms are severe, and recognition is usually easy. Recurrent attacks of dyspnoea and cyanosis in an infant with hyperresonance and mediastinal displacement should suggest a cyst rapidly filling with air. Roentgenograms, either alone or with lipiodol, should confirm the diagnosis. Small multiple cysts may remain silent unless infection supervenes. Unfortunately, infection is the rule. Symptoms simulate severe bronchiectasis and death usually occurs within the first few weeks or months of life. The particular case reported is interesting because of its duration. A girl, three and one-half years old, first came under observation because of an ulcerated phlyctenular conjunctivitis. The tuberculin test was strongly positive. She gave a history of nonproductive, spasmodic cough, which was severe enough in the first four months of life to be considered whooping-cough. Many fine crackling râles were heard over the left base posteriorly, and the roentgenogram showed a triangular area of honeycombed, increased density in the right cardiophrenic angle. The lateral line was quite sharp and straight, and ended at a point on the diaphragm where there was tenting. Both hilum shadows were a little heavier and considerably more extensive than normal. The heart and great vessel shadow was within normal limits. A diagnosis of bronchiectasis was made although tuberculosis was suspected. When next seen, ten years later, she still had cough (nonproductive except when she had an occasional cold) and was underweight, but had no cyanosis, clubbing of the nails and no dyspnoea on playing games at school. Examination revealed only slight lagging of the right side on inspiration, and harsh, high-pitched breath-sounds over the right lower chest anteriorly. Roentgenography revealed the same straight diagonal line, tenting of the diaphragm and cysts, whose walls were thinner, showing no infection now. A diagnosis of congenital cystic formation in an accessory lobe of the right lung was made. The two anomalies were interrelated, one probably causing the other. The straight lateral line is found in accessory lobes, while a concave line is found in an atelectatic lobe, the lower line of which flattens out along the medial portion of the diaphragm. This accessory lobe being surrounded by normal lung tissue accounts for the paucity of physical findings and the smallness of the involved area partially accounts for the favorable outcome.—*Congenital Cystic Lung. A Report of Multiple Cysts within an Accessory Lobe, M. J. Thorpe, Am. J. Roentgenol. & Rad. Ther., December, 1935, xxxiv, 724.*—(*E. M. J.*)

Syphilis of Lung.—Syphilis of the lung in adults is seldom diagnosed and is found in only a small percentage of autopsies. Internists and pathologists agree that the lungs of the adult are relatively immune to manifestations of the infection. A few authentic cases have been diagnosed and reported. The diagnosis should be confirmed by history, physical findings, laboratory and X-ray examinations, and response to antisyphilitic treatment. There are no pathognomonic lesions. When lesions do occur they are usually late manifestations of the disease. Roentgenologically, three types may be described: (1) that showing generalized bronchial thickening and producing a fan-shaped effect; (2) that showing miliary and multiple or solitary discrete masses, usually present near the root but also found at the periphery, and developing a delimiting zone of pneumonitis in the early stage; (3) a diffuse lobar form. The first type may be confused with malignant tumor, and in the early stage the second type may resemble lobular tuberculosis or lung abscess. Symptoms and signs may be absent or the patient may have all the complaints of active tuberculosis. Haemoptysis may be the first symptom. The author reports a case referred with a diagnosis of tuberculosis, but the patient undoubtedly had syphilis of the upper and lower lobes of the left lung. The lung cleared entirely after four treatments. Attention is called to the possibility of confusing such cases with tuberculosis or tumors of the lung.—*Pulmonary Syphilis in Adults, with Report of a Case, W. W. Robinson, Radiol., November, 1935, xxv, 596.*—(*G. F. M.*)

Recovery from Amyloidosis.—A thirty-four-year-old man, giving a history of productive cough and fever of five months' duration, was found to have fibrocaseous

tuberculosis of the entire right lung, with a large cavity near the right hilum and an exudative infiltration of the left lung. Pneumothorax was induced on the right side. Two and a half months later a purulent effusion developed. The fluid contained tubercle bacilli and gram-positive cocci. Two months later, in January, 1932, an *empyema necessitatis* perforated through the 8th intercostal space. On May 20, 1932, a thoracotomy was done, and after removing 3.8 litres of pus a rubber catheter was inserted to promote free drainage. By July the patient had begun to improve, and by January, 1933, he was afebrile. At the time of writing (May, 1935) the fluid had been completely resorbed from the right side of the chest, and there was only 0.5 cc. of pus draining daily from the thoracotomy sinus. By July, 1932, nine months after the appearance of the empyema, amyloidosis had developed as evidenced by retention of congo-red (54 per cent), albuminuria, and hepatomegaly. In March, 1933, nine months after the patient had begun to improve clinically, and two months after he had become afebrile, the amyloidosis reached its peak. There was at this time 100 per cent retention of congo-red. The patient was excreting 10 gm. albumin in the urine daily. The serum-albumin had fallen to 1.96 gm. per 100 cc. There was a three-plus hepatomegaly, a two-plus splenomegaly, and a two-plus peripheral oedema. The clinical and laboratory findings from that time on showed gradual improvement of the amyloidosis, and by April, 1935, the retention of congo-red was only 10 per cent. The excretion of albumin was 1.75 gm. daily. The serum-proteins had returned to normal, and the above-mentioned abnormal physical findings had disappeared. At no time was there evidence of impaired renal function. Although the patient was given liver therapy from the middle of 1933 to August, 1934, the regression of the amyloidosis is felt to be due to improvement in the tuberculosis.—*Recovery from Generalized Amyloidosis Secondary to Pulmonary Tuberculosis, M. R. Rosenblatt, Arch. Int. Med., March, 1936, lvii, 562.*—*(C. L. D.)*

Haemoptysis in Trichiniasis.—The occurrence of pulmonary signs and symptoms in trichiniasis is fairly well known and a variety of pathological lesions of both lungs and bronchi has been described to account for them. In Minot and Rackemann's series 50 per cent of the patients showed pulmonary signs or symptoms. There were three with blood-tinged sputum. In 1860, Wunderlich reported a case of haemoptysis in a butcher, the first diagnosis being acute tuberculosis but the later one trichiniasis. Kestner has described a pneumonia due to trichinae but his description of symptoms suggests infarction. Spink and Augustine recently reviewed 35 cases, of which two had cough with bloody sputum. Askanazy experimentally found young trichinae in lungs causing embolization with bronchiolar and alveolar haemorrhage. Frothingham reported necropsy findings in a case which supported Askanazy's experimental work. Ordinarily, in the differential diagnosis of haemoptysis, trichiniasis is not considered, and many textbooks neglect to mention it. In view of the frequency of trichina infestation and the little attention paid to the possible occurrence of haemoptysis in association with it, three cases are here reported. In one case the diagnosis was definitely established by biopsy; in the others the history and clinical symptomatology left little room for doubt. It is of interest that, in the third case, the onset was with coryza, chills, malaise and cough, and that bronchial neoplasm and bronchiectasis were suspected; also, that eosinophilia was not reported until quite late. Failure to find trichinae in the sputum corresponds with other observations. —*Hemoptysis in Trichiniasis, L. J. Goldwater, I. Steinberg, H. Most, & J. E. Connery, New England J. M., October 31, 1935, ccxiii, 749.*—*(A. P.)*

Prognosis of Early Pulmonary Tuberculosis.—The prognosis in any given case is difficult but should be attempted. Undue importance should not be attached to the extent of physical signs. Toxic symptoms are of greater importance, and their persistence after complete rest and nursing-care augurs a worse outlook than persistence of physical signs and disappearance of toxic phenomena. Gradual increase in severity of such symptoms is not favorable, and the previous state of the patient's health is a factor to be considered. Persistence or increase of toxic symptoms with little or no apparent impairment of lung tissue should suggest the possibility of extrapulmonary involvement. The genitourinary tract must be kept in mind. Death is most common between the ages of 20 and 25 years; greater in females between 15 and 30 and greater among males after 30 years. A general predisposition to the disease is probably transmitted from parent to child, and the prognosis of an individual of a family in which there had been deaths from tuberculosis would be more grave than normally. Prognosis in cases with insidious onset must be guided often by the response to proper treatment. The presence of healed areas in the lung makes it more favorable. When

the duration of symptoms is short and there is moderate destruction of lung tissue, bodily response must be assumed to be weak and the prognosis bad. A small unilateral lesion is favorable, and early involvement of both lungs denotes a bad outlook. Prognosis in the pneumonic type is unfavorable. It is usually believed that cases starting with haemoptysis are favorable, but bleeding should not be considered lightly, especially in a young adult. It should be assumed that it indicates pulmonary disease, in spite of possible negative evidence, and the prognosis will be influenced by this consideration. In onset with spontaneous pneumothorax, prognosis is difficult, but, lacking sufficient evidence and assuming a good contralateral lung, it is usually good. Very often, idiopathic pleurisy with effusion is followed a few years later by definite evidences of pulmonary disease. Laryngeal involvement is usually late. Prognosis is more serious when the larynx is involved and the lungs only slightly so. Prognosis will also be influenced by the treatment that is available and the patient's capacity to carry out such treatment, for to-day we see cases with poor outlook make rapid improvement and go on to enjoy moderately good health when proper treatment has been carried out.—*The Prognosis of Early Pulmonary Tuberculosis, J. B. Alexander, J. State Med., July, 1936, xliv, 402.*—(*L. F. B.*)

Prognosis in Pulmonary Tuberculosis with Cavitation.—Until comparatively recently, cavity-formation in the course of pulmonary tuberculosis was regarded as a terminal and incurable stage. However, with adequate treatment, closure and restoration of a patient's working capacity are possible, and, in many cases, without resort to collapse therapy. Statistics published from Trudeau Sanatorium in 1931 noted that collapse therapy was applied only to those patients who, after a preliminary period of general treatment, failed to show satisfactory healing. McMahon and Kerper, at Loomis Sanatorium, found spontaneous closure in 22 per cent of 296 cases with cavitation and obliteration by collapse therapy in 34 per cent. Altogether, 39 per cent obtained closure and 25 per cent more were much improved. These figures are in striking contrast to those of Barnes and Barnes who, in a series of 1,454 cases with cavitation, found a mortality of 80 per cent within one year, and of Watt, with a smaller series not treated by collapse. The most probable explanation of the discrepancy is that the authors quoted have not differentiated between the various types of cavities at different stages of the disease. Jacquerod, describes three stages in cavity development, beginning with a comparatively ill-defined circular shadow, passing through a second stage with a well-defined ring, and ending with the typical thick-walled cavity seen in the chronic case of some years' duration. Pottenger has pointed out that "the healing of early cavities depends primarily on the patient's ability to marshal an adequate defense, while the healing of a late cavity is primarily a mechanical problem . . . the fact that the disease has become chronic denotes resistance." Keers has studied the case-records from the Tor-na-Dee Sanatorium, Aberdeenshire, and analyzed 100 consecutive cases with cavitation from the end of 1924 until the beginning of 1930, their progress being followed to the end of 1932, at which time 49 were living and 51 dead. Of those living, 5 had bilateral cavitation, 22 on the right and 22 on the left. All but eight had bilateral disease. The basis of treatment was bed-rest and the usual hygienic-dietetic regimen, supplemented in suitable cases by collapse therapy, in 21 instances artificial pneumothorax. In only one-third of the latter was collapse effective, and another one-third underwent other forms of collapse, usually phrenic evulsion, of whom 4 became arrested or improved, compared with 3 of 7 who had no subsequent procedures tried. A group of 28 regarded as unsuitable for collapse had general rest treatment, in some instances supplemented by sanocrysin or colloidal calcium. Of these, 13 achieved arrest. This term was applied to those able to lead a reasonably normal life and either sputum-free or sputum-negative. Complete obliteration of the cavity was not necessarily required. Of patients who had died, 9 had bilateral excavation, 25 right and 17 left. Artificial pneumothorax was attempted in 11, and was not effective in any case. *Summary of results: 1:* Artificial pneumothorax was applied in 24 cases (operative failures not included), of which 9 obtained arrest and 10 died. *2:* Thoracoplasty was applied in 9 cases, of which 3 obtained arrest and 2 died. *3:* Rest treatment alone was applied in 67 cases, of which 13 obtained arrest and 39 died. It does not appear that pneumothorax was more effective in the first-stage cavities than in the more advanced ones. However, the sum total of cases obtaining arrest was much higher for first-stage cavities (nearly 50 per cent) and lowest for third-stage (less than 20 per cent). No fatal haemorrhages occurred with first-stage cavities, and 8 of 10 such were those in the third stage. *Conclusions: 1:* The prognosis in cavity cases is closely related to the type of lesion. *2:* When cavity is in the lower lobe the outlook is

serious unless it can be effectively dealt with by collapse. *3:* Artificial pneumothorax . . . has been unexpectedly disappointing, due mainly to pleural adhesions preventing effective collapse. The result . . . would probably be improved . . . by earlier application. *4:* Phrenicectomy is of limited value in cases of excavation and in none of these . . . was alone sufficient to obliterate cavities. *5:* In carefully selected third-stage cases thoracoplasty is more likely to produce benefit than any of the other collapse procedures. *6:* An uncollapsed cavity is a potential source of severe haemoptysis, and 20 per cent of deaths in this series were due to such cause.—*Cavitation in Pulmonary Tuberculosis. A Review of One Hundred Cases, R. Z. Keers, Tubercle, December, 1935, xvii, 106.*—(*A. P.*)

Distribution and Prognosis of Pulmonary Lesions.—The lung field may be divided into six regions. Areas 1, 2 and 3, respectively, about equally divide the upper third of the lung, and are numbered from the mediastinum to the chest-wall. Area 4, having an almost horizontal upper border and dipping in a salient to the diaphragm in the midthoracic line, comprises the middle third of the pulmonary cone. Area 5 is a cardiophrenic triangle, the lateral border of which extends from the hilum to the middle of the diaphragm. Area 6 is the costophrenic triangle left by area 4. Areas 1, 2 and 3 are typical sites of origin for adult type, while area 4 is the site for the childhood-type tuberculosis. Severe lesions in area 4 are based on the posterior, and slighter ones on the anterior chest-wall. Chronic nontuberculous bronchopneumonia at all ages almost invariably originates and has its maximum severity in the cardiophrenic angle, whence during exacerbations it spreads along the diaphragmatic contour. Such lesions are associated with persistently negative sputum and, in children, with tuberculin reactions consistently negative for years. In 51 cases sputum-positive lesions of both childhood and adult types, that have become sputum-negative with little or no treatment, have been observed in synchronized stereoscopic roentgenograms and in closely spaced multiangular views (the angle varying from 5 to 60 degrees depending on the silhouette). Two patients in the series were under 10, and 9 were over 45 years of age. The tuberculous lesion was classified as minimal in 13, as moderate in 24, and as far advanced in 14 cases, while the cardiophrenic lesions were severe in 31, marked in 15 and slight in 3 cases. These 51 cases were compared with cases of uncomplicated nontuberculous pulmonary lesions and uncomplicated tuberculosis. It was found that tuberculous lesions (in areas 1, 2, 3 or 4), which were associated with active and persistent lesions in area 5, retrogressed rapidly, with contraction of cavities and disappearance of tubercle bacilli from the sputum. With complete arrest of the tuberculous lesions, the lesion in area 5 may fluctuate for years, with persistently negative sputum. On the other hand, in many clinic cases relapse of tuberculosis has followed healing of a lesion in area 5, during the acute stage of which the apical or childhood-type lesion had retrogressed. Lesions that, according to the accepted classification, are far advanced because the greater part of the lung including area 5 is involved have had a more favorable course than lesions of lesser extent and severity which are confined to the upper two-thirds of the lung field or have invaded area 5 only in terminal stages.—*The Distribution and Prognosis of Pulmonary Lesions. Associated Tuberculous and Nontuberculous, F. M. McPhedran, Am. J. M. Sc., November, 1935, cxc, 659.*—(*E. M. J.*)

Clinical Estimation of Resistance.—Close observation and long acquaintance with tuberculosis, supplemented by sound clinical background and a knowledge of pathology, can usually justify a fairly accurate prognosis. Among factors to be considered are (1) history and mode of onset—cases with febrile onset or following debilitating disease are least favorable; pleurisy is chiefly important as regards the feasibility of pneumothorax therapy, obliterative adhesions being the rule; the poor have an advantage over the rich in the degree of revolution in their mode of life while under treatment, but a disadvantage in the facilities for continuing this; the family history is important chiefly in discovering the degree and length of possible exposure: (2) general appearance and personal estimate—intelligent inspection of the stripped patient is most important, for loss of muscle tone, myotonic irritability or wasting, tendency to sweating, color of skin and nail-beds, are all important indications of the constitutional effects of the disease, and the state of nutrition should be noted, while an estimate of temperament or personality is highly important and (3) physical and X-ray findings which should complement each other and each be done carefully and completely, for to neglect either is futile; the X-ray film will show better the early, clinically silent, thin-walled cavity and distinguish it from the more serious thick-walled long-standing vomica, and, by indicating the full extent of contralateral involvement, it will help settle the important question of collapse

therapy. The quantitative tuberculin test is probably of no significant prognostic value. Serum flocculation tests, such as the Vernes, may be of value, the technique is simple, and the error due to personal equation small. Valuable are the erythrocyte sedimentation rate, repeated at intervals, and blood-film examinations. The rapidity of red-cell sedimentation is particularly an index of tissue disturbance or protein disintegration. Stained blood-films may be useful for classifying the neutrophilic leucocytes or for determining the percentage ratio of lymphocytes, monocytes and neutrophiles, this information that should be regarded as merely suggestive or supplementary. The estimation of vital capacity is a further functional test, while the determination of type of tubercle bacillus is more of academic than practical interest.—*Remarks on the Clinical Estimation of Resistance in Pulmonary Tuberculosis, D. P. Marais, British J. Tuberc., April, 1936, xxx, 72.*—(*A. P.*)

X-Ray in Prognosis of Tuberculosis.—From a study of selected groups of several hundred consecutive admissions to Trudeau Sanatorium, and following the patients in each group for some years, the following conclusions are drawn: The extent of pulmonary involvement greatly influences the prognosis in pulmonary tuberculosis, the death-rate being in direct proportion to the amount of disease. The presence of cavities nearly doubles the probability of death within five years. Cavity cases showing improvement under treatment have approximately five times as favorable a prognosis as those in which the cavities become larger during sanatorium residence. Patients whose comparative roentgen examinations are constantly favorable under sanatorium treatment have more than twice as good a chance of being well at the end of a five-year period and only one-fourth as a great a chance of being dead as those who have increased X-ray shadows. Increase of infiltration in comparative X-ray studies suggests a prognosis about equally unfavorable with that indicated by the presence of fever. Patients with both fever and increased X-ray shadows have six times as unfavorable an outlook as those who are afebrile and who show consistent roentgenographic improvement. Increased comparative X-ray shadows are of much graver prognostic significance than increased physical signs (râles).—*Use of the X-Rays in Pulmonary Tuberculosis from the Point of View of Prognosis, F. B. Trudeau, J. Am. M. Assn., February 22, 1936, cvi, 592.*—(*G. L. L.*)

Red-Cell Sedimentation and Blood Viscosity.—The viscosity of the whole blood, and not that of the plasma alone, determines the sedimentation rate of blood cells. This viscosity is influenced by a large number of factors. Among these Einstein's formula expresses some of the important factors: $N = N^{\circ}\ (1 + 1.25V)$, where N is the viscosity of the suspension, N° the viscosity of the fluid medium, and V the volume occupied by the particles in suspension. It results from this that a reduction in the number of red cells in the blood will reduce viscosity of the blood, and hence increase the sedimentation rate. An increase in the volume of the individual corpuscles without any increase in number will also increase the viscosity of the blood, and delay sedimentation. The viscosity of the plasma itself is primarily determined by the protein in solution and especially by the ratio existing between the different proteins in solution. An increase in the relative concentration of the large molecules, such as the globulins at the expense of the albumins, will reduce the viscosity of the plasma due to the relatively smaller number of globulin molecules in the plasma in relation to the number of the smaller molecules of albumin; crystalloids in solution exert little influence on blood viscosity and hence on the sedimentation rate.—*Sédimentation globulaire et viscosité sanguine, M. Bernon, Rev. tuberc., February, 1936, ii, 152.*—(*M. B. L.*)

Vaccination against Tuberculosis.—There is much experimental evidence in favor of the viewpoint that previous contact with tubercle bacilli produces a certain immunity to tuberculosis. In guinea pigs, appropriate previous injections with avirulent human or bovine tubercle bacilli given intracutaneouly, subcutaneously or intravenously, retard the development of subsequent infection with virulent human or bovine tubercle bacilli. Avirulent human strains of tubercle bacilli have never before been tested in viable form on man. The human beings used in the test showed no clinical evidence of tuberculosis or other diseases. They were given intracutaneous tests of purified tubercle protein to determine their relative tuberculin-reacting power. The subjects were thus grouped as being relatively tuberculin-negative or -positive, and given avirulent human or bovine tubercle bacilli intracutaneously. Whether the bacilli were viable or not (heat or chemically killed) or whether they were avirulent human or bovine tubercle bacilli, the intracutaneous lesions produced with concentrations ranging from 0.001 mgm. of bacilli in fine suspension

to 1.0 mgm. per cc. paralleled each other in man as well as in animals. The larger doses usually cause transient pyrexia, with local lymph adenopathy and a tendency to suppuration. The lesion, under these conditions, usually took six months to heal. By a special culture technique it was shown that bacilli could be recovered from the site of injection up to four months, but not six months after inoculation. This established the fact that both strains used are harmless for man. Following each subsequent dose, a more pronounced reaction occurred with resulting larger and more extensive lesion. There was more tissue reaction in the immune than in the nonimmune organism, in spite of the fact that the bacilli were not capable of multiplying in the tissues. When viable avirulent tubercle bacilli are to be used for vaccination, it would appear advisable to use intracutaneous injections for this purpose and to use an amount of bacilli well within the range of producing visible reactions but no large abscesses or ulcers. Two or more intracutaneous injections at semimonthly or monthly intervals are suggested. The source of the avirulent human strain of tubercle bacillus is not revealed. The avirulent bovine strain was *BCG*. Apparently, insufficient time has elapsed to determine the actual protective value of the vaccination.— *Vaccination against Tuberculosis. A Comparative Study in Man and Animals, H. J. Corper, A. P. Damerow, M. L. Cohn & C. B. Vidal, J. Infec. Dis., March-April, 1936, lviii, 158.*—*(J. S. W.)*

Key to Abstractors

A. P.: Andrew Peters, Springfield, Massachusetts.
C. L. D.: Charles L. Dunham, Chicago, Illinois.
E. M. J.: Edna M. Jones, Northville, Michigan.
F. B. S.: Florence B. Seibert, Philadelphia, Pennsylvania.
F. G. K.: F. G. Kautz, New York City.
G. F. M.: Gertrude F. Mitchell, Northville, Michigan.
G. L. L.: George L. Leslie, Howell, Michigan.
J. S. W.: J. Stanley Woolley, Loomis, New York.
L. F. B.: Lauren F. Busby, Northville, Michigan.
M. B. L.: Max B. Lurie, Philadelphia, Pennsylvania.
M. T. W.: Mildred T. Woolley, Tucson, Arizona.